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Original Research Article

A randomised study to evaluate the efficacy of isotretinoin, electrodessication and comedone extraction in the treatment of comedonal acne

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ABSTRACT

Background: Comedonal acne commonly seen in adolescents and young patients which is refractory to standard treatments. This study is being undertaken to determine the efficacy and adverse effects of oral isotretinoin, electrodessication and comedone extraction in patients of comedonalacne.
Methods: A total of 120 patients of comedonal acne were enrolled and randomly divided into 4 groups of 30 patients each. Group A, B, C and D patients were treated with isotretinoin (20 mg daily), electrodessication, comedone extraction (4 weeks interval) and topical antibiotic daily for 12 weeks. The response in each group was assessed based on decrease in total comedonal count after 12 weeks of treatment. Statistical analysis was done using chi square test.
Results: Eighty seven (72%) cases had predominantly closed comedones and 33 (27%) cases showed open comedones. After 12 weeks of treatment, more than 75% decrease in comedonal count was seen in 60% of patients in electrodessication group followed by 30% (isotretinoin), 13.3% (comedone extraction). The decrease in total number of comedone was significantly higher with electrodessication (84.4%) followed by isotretinoin (73%), comedone extraction (43.2%) and topical antibiotic (5.7%). After follow up of 3 months, recurrence of comedones was least with isotretinoin followed by comedone extraction and electrodessication.
Conclusions: For comedonal acne, initial electrodessication followed by isotretinoin over 12 weeks gives the best outcome of quick remission and least recurrence. Electrodessication and comedone extraction are the preferred modalities in patients with predominantly closed and open comedones respectively.

Keywords: Comedonal acne, Isotretinoin, Electrodessication

INTRODUCTION

Acne is a chronic inflammatory disease of pilosebaceous unit characterised by seborrhea, comedones, papules, pustules and nodules leading to scarring in some cases.[1,2] Comedonal acne is a non inflammatory variant of acne usually seen in young patients characterised by development of open and closed comedones which is refractory to conventional treatment modalities.[3] Isotretinoin and topical retinoids including tretinoinand adapalene are commonly used for the treatment of comedonal acne with poorefficacy.[4] Procedural treatments such as comedone extraction and electrodessication are the preferred modalities for this variant of acne.[5] This study was undertaken to compare and evaluate the efficacy and adverse effects of oral isotretinoin, electrodessication and comedone extraction in patients with predominantly comedonal acne.

METHODS

This study was carried out in patients who attended the outpatient department of Dermatology at MIMS hospital in Nellimarla, North Andhra Pradesh. It was a prospective, hospital based interventional study carried out over a period of 18 months from January 2014 to June 2015 after being approved by Institutional Ethics Committee. The sample size was calculated by difference of means formula. To achieve a power of study of 80% and precision alpha of 0.05 with a 95% confidence interval (CI), the estimated total sample size was determined to be 120.

Clinically diagnosed cases of comedonalacne of both sexes in the age range of 16-45 years who did not use any treatment in last 6weeks were enrolled. Known cases of diabetes, hyperlipidemia, drug induced acnei form eruptions, pregnant women and women desiring pregnancy or using temporary methods of contraception were excluded from the study.

After taking informed consent, general demographic data regarding age, sex, and contact details were noted. Detailed history was taken regarding duration of disease, age of on set, and previous treatment. Thorough dermatological examination was done. For counting the comedones, face was divided into 4 quadrants by drawing two imaginary lines: one dividing face into 2 halves and other from alae nasi to ear lobule. Baseline total comedonal count in each patient was determined by addition of number of comedones in all four quadrants. Baseline complete hemogram, serum lipid profile and liver function tests were performed in all patients.

Patients were randomly divided into four age and sex matched groups, consisting of 30 patients each (group A, B, C, and D) using Clinstat software. Group A patients were treated with oral isotretinoin 20 mg daily for 12 weeks. EMLA Group B patients were subjected to electrodessication at 4 weekly intervals for 12 weeks. Group C patients underwent comedone extraction at 4weekly intervals for 12 weeks; they were also advised to use topical adapelene 0.1% gel daily at night and Group D patient comprising the control group received topical clindamycin gel to be applied at night for 12 weeks. Electrodessication and comedone extraction were performed after applications of EMLA cream for one hour. Patients in all groups were followed up at 4 weekly interval for 12 weeks. At each follow up visit, total comedonal count was obtained in each patient to determine the decrease in total comedonal count. Photographs were taken at each follow up visit and adverse effects if any were noted. Data was statistically described in term of range, mean, standard deviation (±SD), mode of frequencies (number of cases) and relative frequencies (% of cases). All statistical calculations were performed using SPSS version 20 (Statistical Package for Social Science SPSS, Inc. Chicago, IL, USA). Analysis was done using student 't' test and p value <0.05 was found to be statistically significant.

Table 1: The comparative efficacy of all the four treatment modalities after 12 weeks.

Groups (n=30)	Mean % decrease in total comedone count after 12 weeks	P value
Isotretinoin (group A)	73.03±2.4	0.000
Electrodessication (group B)	84.4±1.9	0.000
Comedone extraction and topical retinoid (group C)	55.3±2.3	0.000
Topical antibiotic (group D)	7.76±1.7	0.000

RESULTS

Out of the total 120 patients, 63 (52.5%) were females and 57 (47.5%) were males. Majority (99.16%) of patients were in the age range of 15 to 32 years with mean age of 19.87 years. Duration of comedonal acne of more than 1 year was seen in (51.66%), whereas duration of more than 2 years was observed in 21.66% of cases. Involvement of cheeks and forehead was seen in 63 cases (52.5%), cheeks, chin and forehead were involved in 51 cases (42.5%) and only forehead was involved in 6 cases. Predominantly closed comedones were seen in 87 cases (72.5%) and predominantly open comedones 33 (27.5%) of patients.

Table 2: The efficacy of all treatment modalities on open and closed comedones.

Groups	No of cases	Mean % of improvement after 12 weeks in open comedones	P value	No of cases	Mean % of improvement after 12 weeks in closed comedones	P value
Isotretinoin	10	67±2.12	0.000	20	76.6±2.76	0.000
Electrodessication	9	77.4±1.97	0.000	21	89.6±1.85	
Comedone extraction and topical retinoid	6	86.7±2.38		24	45±2.25	0.000
Topical antibiotic	8	5.7±1.66	0.000	22	6.8±1.78	0.000

Figure 1: (a) Multiple comedones over the cheeks: before and after 12 weeks treatment with isotretinoin. (b) Multiple comedones over the cheeks: before and after 12 weeks treatment with electrodessication. (c) Multiple comedones over the cheeks: before and after 12 weeks treatment with comedone extraction and topical retinoid.

Before initiation of treatment, mean comedonal count in Group A, B, C and D patients were 47.1, 57.4, 57.6, and 59.9 respectively. After 12 weeks, mean comedonal count in A, B, C and D were 12.7, 9.1, 25.7 and 55.25 respectively. After 12 weeks, more than 75% decrease in comedonal count was seen in 60% and 30% patients in electrodessication and isotretinoin group respectively whereas it was 0% in comedone extraction group and topical antibiotic group. Based on decrease in total number of comedones after 12 weeks of treatment, efficacy of electrodessication (84.14%) was found to be significantly higher compared to other treatment modalities (Figure 1b). The decrease in total number of comedones in isotretinoin group was 73.03%, 55.38% in comedone extraction group and 7.76% in topical antibioticgroup (Figure1a and 1c).

Response rates for open comedones was found to be significantly higher with comedone extraction (86.7%), followed by electrodessication (77.4%) and isotretinoin (58%) (SP<0.05). Electrodessication (89.6%) was found to be more efficacious for closed comedones followed by isotretinoin (76.6%) and comedone extraction(45%) which is statistically significant (p<0.05) (Table 2).

Table 3: Recurrence rate after follow up of 3 months.

Group	After 12 weeks	
	No. of patients	Percentage (%)
Isotretinoin	5	16.66
Electrodessication	27	90
Comedone extraction and topical retinoid	21	70
Topical antibiotic	28	93.33

Common Adverse effects observed in isotretinoin group were cheilitis, dryness of skin, headache and hair fall whereas superficial scarring and transient dyspigmentation were seen in group B and C. No adverse effects were seen in group D. After a follow up period of 3 months, recurrence of comedones was found to be maximum with electrocautery (90%) followed by comedone extraction (70%). Least recurrence was found with oral isotretinoin (16.66%) (Table 3).

DISCUSSION

Comedonal acne is the non inflammatory variant of acne seen in relatively younger age group of patients, which is refractory to routinely used topical and systemic anti acne medications.[1,2] It has been observed that patients with comedonal acne are either slow to respond or recalcitrant to isotretinoin therapy.[3,4] Mechanical extraction of comedones using a comedone extractor or treating with light electrocautery are reasonable adjunctive procedures.[5] Many recent studies have shown that use of low dose regimens of isotretinoin for mild to moderate acne is cost effective and causes fewer side effects. In this study, we compared the different modalities which are beneficial in the treatment of comedonalacne.

In the present study, female preponderance was observed with male to female ratio of 0.9:1 with a mean age of 19.82 years. Total comedonal count was detertmined by dividing the face into four quadrants and counting the total number of closed and open comedones. We followed this simple technique as it was easy to perform, objective and reproducible. In earlier studies done by Lucky et al lesion count was done by dividing face into five quadrants while Luchina et al assessed severity of comedonal acne based on four point scale using flourescent photography.[6,7] The closed to open comedones ratio was found to be 2.63:1, whereas markedly higher prevalence of closed comedones was seen in a study done by Balaji et al (closed to open comedones ratio 4.9:1).[8]

In patients who were treated with oral isotretinoin, at the end of 12 weeks, >75% reduction in comedonal count was seen in 9 (30%) patients and the mean decrease in total comedone count was 48.3 (73.03%). Isotretinoin regulates the abnormal follicular differentiation of keratinocytes in pilosebaceous ducts and is the only systemic drug with comedolytic action.[9] In patients, who were subjected to electrodessication**,** >75% improvement was seen in 18 patients (60%) and the mean decrease in total comedonal count was 48.3 (84.14%). Electrofulgration under EMLA cream was found to be significantly superior to topical retinoid by Bottomly et al.[10] In their study, electrodessication was shown to be more efficacious to fulguration in the treatment of larger comedones (more than 1 mm). Electrodessication eradicates comedones by means of generating very low grade thermal damage and provides a route for contents of the macrocomedones to be discharged to skin surface thereby enhances the therapeutic efficacy of topically applied comedolytic agents.[11-13]

In comedone extraction group, 13.3% of cases showed 51-75% of improvementand mean decrease in total comedonal count was 31.9 (55.38%). In contrast to isotretinoin and electrodessication group, none of the patient achieved ≥75% decrease in total comedone count. In a previous study done by Wise et al, comedone extraction was performed for macro comedones which were resistant to oral isotretinoin.[14] The authors found that comedone extraction along with oral isotretinoin showed better results with complete clearance of acne.[15] Patients who underwent comedone extraction were also advised to use topical adapalene 0.1% gel at night which has synergistic comodelytic activity and aided in the quick extractioncomedones.[16-18] Patients who received topical clindamycin 1% gel had poor response and 86.66% showed <25% improvement with mean decrease in comedonal count of 4.65 (7.76%). Topical antibiotics haveno comedolytic action which explains the extremely poor response in this group. Standard guidelines also strongly discourage the use of antibiotic monotherapy in the management of acne of cases.[19,20]

At the end of 12 weeks, by considering decrease in total comedonal count, electrodessication (84.14%) was significantly superior to other treatment modalities-isotretinoin (73.03%), comedone extraction (55.38%) and topical antibiotic (7.76%). However, while considering open comedones alone, comedone extraction was most efficacious whereas for closed comedones electrodessication as significantly superior to other treatments.

The adverse effects observed in patients of all groups were mild and self limiting. Dryness and cheilitis were commonly observed in patients on isotretinoin. Pigmentary alterations and superficial scaring seen in electrodessication and comedone extraction group were of mild severity and did not lead to discontinuation of treatment. After follow up period of 3 months, recurrence of comedones was observed to be least with isotretinoin followed by comedone extraction and electrodessication.

CONCLUSION

To conclude, electrodessication is the preferred treatment in patients with predominantly closed comedones. Comedonal extraction is the first choice treatment for patients when open comedones are more in number. Oral isotretinoin though less efficacious than electrodessication and comedone extraction, has the advantage of least recurrence rate over the longer term. In view of the above findings, we suggest that initial electrodessication followed by systemic isotretinoin over 12 week period gives the best outcome of quick remission and least recurrence.

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